

Educator Guide	
Educators and Students	K-12

1-ALPHA-602.

DataSlate[©]

DataSlate is a multi-curricular visualization tool for the user to conduct investigations of our universe.

DataSlate operates on either the PC or the Macintosh platform.





DataSlate® Plus

Consortium for the Application of Space Data to Education

Visualization Software

Earth and Planetary
Data Sets

Lesson Plans



Introducing:

New Teacher Guide

Introduction

DataSlate is a multi-curricular visualization tool for students to conduct investigations of our universe. Like an X-ray, DataSlate allows students to look beyond the surface. Among DataSlate's amazing capabilities is the power to compare images gathered over time, thus providing students with an opportunity to look back and observe historical, geographical, geological and environmental change. The CD includes 12 sample data sets with 12 sample lesson plans. Teachers may borrow from these "starters" or build their own engaging problem based learning scenarios.

Before Opening DataSlate.

- Shut down other applications or programs.
- Insert the CD in your computer or download the application from the Office of Internet Studies, University of Nebraska-Omaha and follow the directions at the site.
- Click to open index.htm in your web browser.
- Click on the Operator's Manual button. This is a web page designed to provide the first time user with descriptions of DataSlate features.
- Next, click the Tools button to investigate how these work.

Opening DataSlate (QuickStart)

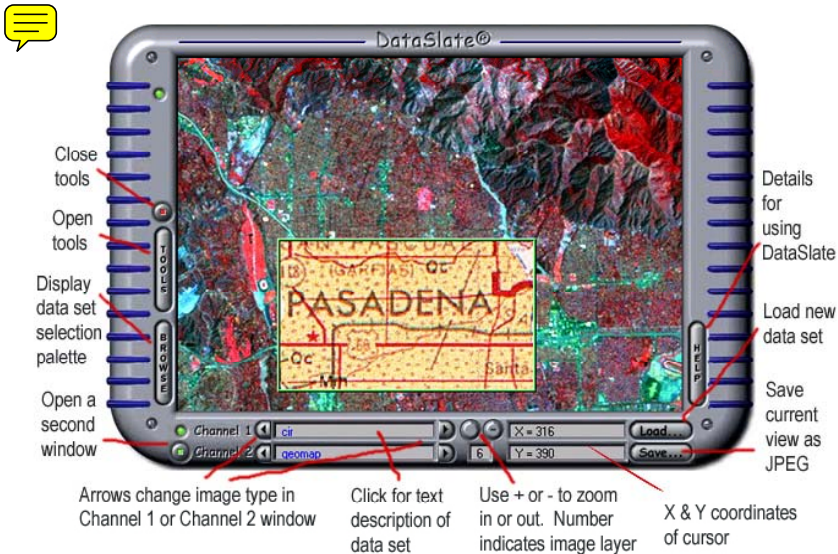
- Shut down your web browser or any other applications that you may have open. DataSlate will run best with no other applications or programs open.
- From the CD, open DataSlate by double clicking on *dslatamac alias* for Classic Macintosh users or *dslatamacOSX alias* or *dslatepc.bat* for PC users. (If the Mac alias doesn't operate, within the DataSlate folder, go to: dslate > program and double click on *dslate.jar*).
- Click once on any data set to open it. Be patient, these are large data sets and take some time to load. Flood Control or Pathfinder are good places to start.
- Play! Open both channels and explore. Experiment by clicking the red button to the left of channel 2 and change images in each channel by clicking the arrows on either side of the text field.
- Click on text in either channel window to go to the written description found with each data set.
- Return to your web browser to view more detailed information about Data Sets and Sample Lessons. In addition you will find a comprehensive Glossary.

DataSlate Plus CD Overview.

DataSlate Program

The DataSlate program is written in Java. Both Mac and PC versions are included. The software is constantly being refined, and the latest versions for each platform can be downloaded from the Office of Internet Studies at the University of Nebraska-Omaha.

DataSlate V 1.2.5 Screen:



12 Data Sets

Twelve Data Sets have been selected to demonstrate various remote sensing and image processing technologies, and their uses. Images are viewed through the DataSlate application and include:

- Aerial photographs, maps and land use overlays .
- DEM or (Digital Elevation Models).
- Thematic Mapper or (TM images)
- False-colored images across the electromagnetic spectrum
- General and technical text descriptions for each set
- Teacher pages with background information and resources

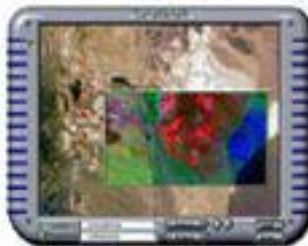
Twelve Building Blocks (Lesson Plans) for teachers include:



- Student pages with printable work sheets and answer keys
- Links to national standards.



Is Snoopy on Mars?



Gold Rush!

Web Pages

Web pages containing essential and supplementary material.

Opening index.htm in your web browser will lead you to:

- Operator's Manual.
- Tools Tutorial.
- Data Sets Index.
- Building Blocks (Lesson Plans) Index.
- Glossary.

About Data Sets.

The data sets cover 12 different locations; each set contains 2 or more different types of images of the same location. In addition to visible light there are false-color images representing a range of the electromagnetic (E M) spectrum not visible to humans. Some sets use the same type of images taken over a period of time.

General and technical descriptions for each set are available within DataSlate by clicking on the text in the channel window. Less verbose descriptions can be found using your web browser at [Data Sets](#). The [Glossary](#) will help explain some of the terms and acronyms.

Twelve Data Sets:

These can be used to create your own lesson, or try starting with a sample lesson plan (Building Block) found on the opposite page, directly to the right of each data set description.

Pathfinder: 360 degree panoramic images from the 1997 Mars Lander. Includes digitally enhanced images, 3-D images, and images with annotations of rock names.

Mars Surface: Composite images of the surface of Mars from 57 degrees north to 57 degrees south. Images were gathered by the Viking Orbiter Missions in the 1970's.

Milky Way: Composite images from Earth and space-based surveys in a variety of energy bands. The images are derived from several space and ground-based surveys coordinated by NASA's Goddard Space Flight Center.

All Sky: A 360 degree view of the entire sky. These images are also derived from several space and ground-based surveys coordinated by NASA's Goddard Space Flight Center.

Flood Control: Aerial photography of a community covering 37 years, showing changes brought about by dam construction.

Rural: Fifty years of land use change in a rural community depicted via aerial photography, soil maps, and water overlays.

Mountains: Views from space showing geologic features associated with tectonic forces. Seasonal changes in vegetation and rain shadow can be seen.

River City: The Missouri River valley with urban and rural land use. Comparative imagery (C I R, Natural, Radar, D E M and T M) helps identify the flood plain and features associated with a meandering river.

Suburban: A densely populated coastal region along the Pacific rim that experiences frequent earthquakes. Topographical and street maps, with some named faults, are included.

Archaeology: A desert environment showing geologic features underneath the sand. Radar interrogates the features, which could not otherwise be viewed.

Coastal: A mountain coastal region with C I R, D E M, T M and Natural views of topographical relief. An annotated image gives some historical place names from the California "Gold Coast" days.

Minerals: Aerial and space based geological and mineralogical image maps. Chemical and physical properties are used to locate various elements and minerals.

Twelve Sample Lessons:

These sample lessons are meant to be “starters” or “models” for your own lessons. They are written for a wide variety of curricular areas and grade levels.

Is Snoopy on Mars? A guide on how to use DataSlate by exploring panoramic images of Mars.

The Largest Volcano in the Solar System: A DEM map is introduced and compared to a topographical map while exploring volcanoes on Mars. DataSlate tools are introduced.

Milky Way: What You Don't See: Compares wave lengths and frequencies across the electromagnetic spectrum including an activity to demonstrate false-color imagery. Stellar objects are examined.

See with New Eyes: Students graph and compare wavelength and frequency of energies across the electromagnetic spectrum. Data from the set is gathered and used to calculate wavelength and photon energy.

Atlantis of Nebraska: An introduction to DataSlate basic operational functions. Comparing land use and changes over time. A coordinate system is used to locate specific features.

Train Traveler: Changes in land use and transportation over a fifty year period are observed.

San Gabriel: Map reading skills and observations of geological features that indicate the effects of geological processes. Tools are used to measure displacement along the San Andreas Fault.

Pioneer Pizza Delivery: Historical western trails area serves as a basis for problem solving using vector addition, scaling, ratios, and compass headings.

Measuring the Shape of Earth's Features: Elevation and how it is measured. DEM images help students understand three-dimensional space and how 3-D position is measured.

Safsaf Oasis, Egypt: Radar image of an oasis uses technology to examine underlying geological structures. Students will locate special features using X,Y coordinates in addition to measuring perimeter and area.

A Rescue Mission: Within a historical context, the students apply functions of algebra, geometry, and trigonometry to solve problems. Topics include: scale, vectors and distance, the Law of Sines and Cosines, and the Pythagorean Theorem.

Gold Rush: Students will use false-color maps to locate mineral deposits. Images use properties of light either transmitted or absorbed from the surface.

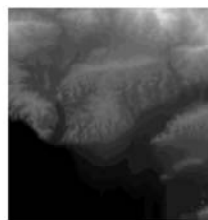
Example: The Coastal Data Set:



In pseudo-natural color



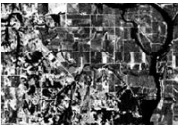
As a false-color infrared



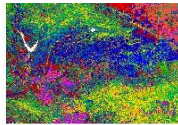
As a Digital Elevation Model (DEM)

Types of Images

Aerial photographs, geographic maps, and land use overlays are included on this CD. Several data sets have digital elevation models (DEM) images. A DEM is a shaded contour map, which may be colored to highlight the changes in elevation.



Landsat TM Band 7



Soils map

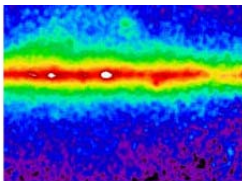


Pseudo color DEM shaded relief



Navigation map

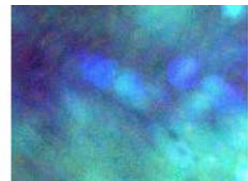
Thematic mapper or TM images are from LANDSAT satellites. TM images gather individual bands of visible light and some bands of energy just beyond visible light such as infrared. Combining certain individual TM bands creates a pseudo-natural color image. By comparing individual bands we can detect unique characteristics about our world.



X ray



Radar



Gamma ray

False-colored image maps are visual models of energy we cannot see. There are radar, X ray, gamma ray and radio wave image maps.

After exploring **Basics** and **Tools** through your web browser and before you look at the lessons, examine the data sets. Be sure to read the descriptions of the images found with each data set. Depending on grade level, individual students, and curriculum one or more sets may better suit your needs. Play with the tools to see what they will do within each data set. Keep in mind you may want to use these tools to develop your own lessons.

Once you are familiar with a particular data set return to your web browser to examine a sample lesson. These lessons are not designed to meet the needs of every student or every classroom. Sample lessons represent only one of the many possible uses for each data set. Modify the lessons to meet your own individual needs or create your own lesson.

Resources and Links.

- Online professional development is available at: <<http://ois.unomaha.edu/dataslate/dsltutorial/>>
- Latest version of DataSlate: <<http://ois.unomaha.edu/dataslate/>>
- Glossary (available on CD via web browser)
- CASDE's Education Component at UNOmaha hosts a database of dozens more lesson plans written around selected data sets: <<http://ois.unomaha.edu:591/casweb/casdb.htm>>

Credits.

Educational Building Blocks (Lesson Plans):

Authors: Paul Clark, Carol Engleman, Duane Glover, Steve Hamersky, Donna Hayes, Roger Kassebaum, Walter Mertz, Mike Ramsgard, and Bill Schnase.

Reviewers: Michael Bicay, Diana Casey, Steve Hamersky, Donna Hayes, Linda Hermans, Ralph Kahn, Sue Koba, Walter Mertz, Rick Perk, Karen Ramaeker, Matt Ray, Ed Schafer, Bill Schnase, Elaine Westbrook.

Coordination: Paul Clark, Neal Grandgenett, Elliott Ostler, Bob Pawloski, Neal Topp.

Technical Assistance: Joey Czikmantory, Bob Goeman, Cynthia Hall-Atkinson, Hook Hua, Don Kucera, Jared Lundell (Millard North High School, Omaha, NE) and Jeff Eske.

Customizing.

DataSlate can be used to introduce concepts and processes, or create realistic problems for students to solve. Use DataSlate to apply observation, inference, measuring, and other skills. Use of DataSlate tools provides a realistic arena for students to develop and apply skills, concepts, and processes inherent to many content areas. Students can measure features in an image, gather data and solve authentic problems. Reading the general and technical descriptions for relevant information can be included. The images themselves are starting points for investigations about technology and science. After some professional development, teachers can, in fact, create their own data sets.

Trouble Shooting.

1. Be patient when loading tools and data sets. Some images may take longer to load for certain computers. If images do not load completely, or some buttons cease to work, close DataSlate, turn off other applications, and restart DataSlate.
2. If DataSlate repeatedly has failures, reboot your computer.
3. Make sure you have installed the latest Java Virtual machine.
For Windows: <http://java.com/en/download/help/index_download.jsp>.
For Macintosh: <<http://www.apple.com/java/>>.
4. Make sure the system on which you run DataSlate is the highest RAM and fastest processor available, or has the proper configuration: (minimum).

For Windows: Pentium 90 (200 preferred), 32 MB RAM.

For Macintosh: Power Macintosh, 32 MB RAM, MacOS 7.6.1

5. Try running DataSlate on another machine, attempting to isolate the problem to a specific machine (a few early model iMacs were noted for problems).



Educator Guide and CD-ROM
Educators and students, K-12

DataSlate Plus Teacher's Guide, Version 1.0
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Space Data to Education (CASDE)

System Requirements:

PC: Pentium 90 (200 preferred), 32 MB RAM
Macintosh: Power Macintosh, 32 MB RAM, MacOS
7.6.1 to OSX

CASDE Partners:

Jet Propulsion Laboratory, NASA;
Office of Internet Studies, University of Nebraska at Omaha;
Center for Advanced Land Management Information Technology;
University of Nebraska at Lincoln.

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Appendix

The latest versions for each platform can be downloaded from the Office of Internet Studies at the University of Nebraska-Omaha

<http://ois.unomaha.edu/dataslate/>

**Online professional development is available at:
<http://ois.unomaha.edu/dataslate/dsltutorial/>**

CASDE's Education Component at U N Omaha hosts a database of dozens more lesson plans written around selected data sets:

<http://ois.unomaha.edu:591/casweb/casdb.htm>

Virtual Machine:

For Windows:

http://java.com/en/download/help/index_download.jsp

For Macintosh:

<http://www.apple.com/java/>